REMARKS

In the Advisory Action dated May 8, 2006, the Examiner indicated that the Applicant's remarks in the Amendment after final dated April 10, 2006 were not persuasive and did not place the case in a condition for allowance. Claims 1-3, 5-12, 14-20, and 22-24 remain rejected under 35 USC 102(b) as anticipated by Sugama (US Patent Publication 2002/0118907) and claims 4, 13 and 21 remain rejected as obvious over Sugama and Nakaura (US Patent 5,604,835). The Applicant has now amended certain claims to remove unnecessary limitations. Claims 1 and 3-25 remain at issue.

THE ART REJECTION

The Examiner has rejected certain claims as anticipated by Sugama. The Applicants strongly disagree. Sugama does not teach the present invention as claimed.

Certain claims of the present invention require lenses formed on the bottom cladding layer and exposed to ambient air. A review of Sugama indicates in all of the many disclosed embodiments, there is no example of a lens formed on a bottom cladding layer and exposed to ambient air.

In the embodiment shown in Figures 9 and 10, the convex lens 4 is shown sandwiched between a bottom cladding layer and a top cladding layer 2. Figure 10 clearly shows (i) that the convex lens 4 is not exposed to ambient air; and (ii) the lens 6 is not provided on a bottom cladding layer. The lens 4 is therefore **not** exposed to ambient air. The lens 6, which is exposed to ambient air, is not formed on the bottom cladding layer.

FIG. 9

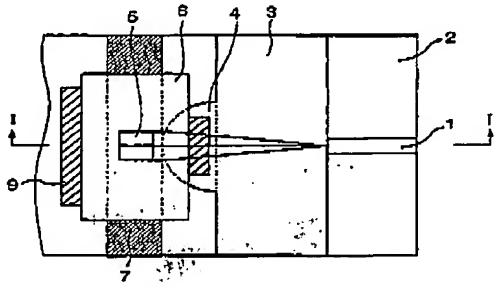
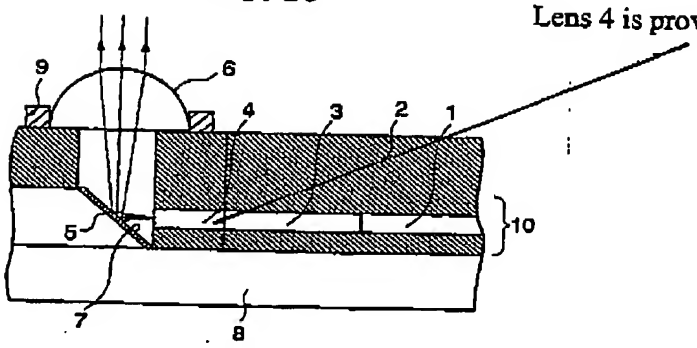
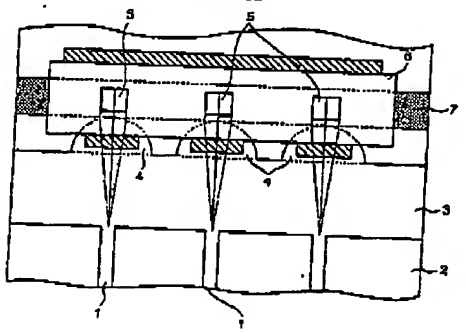


FIG. 10



The embodiment of Figure 12 is similar in structure as the embodiment shown in Figures 9 and 10, with the exception of the lens 6. In the embodiments shown in Figures 9 and 10, a lens 6 is provided over the mirror 5 for each waveguide 3 respectively. See specifically paragraph [0160]. In contrast with the embodiment shown in Figure 12 provided below, a single lens 6 spans several mirrors 5 and waveguides 3. See the last sentence of paragraph [0168]. Therefore again, (i) the lenses 4 illustrated in figure 12, are **not** exposed to ambient air; and (ii) the lens 6 is not provided on a bottom cladding layer.

FIG. 12



The lens 4 is not exposed to ambient air in any of the embodiments of Sugama. The claims reciting the plurality of optical lenses being formed on the bottom cladding layer and exposed to ambient air are therefore patentably distinct over the Sugama reference.

Other claims of the present invention are directed to a core channel having a curved section which follows a curved path and top cladding layer that is patterned to exposed the curved section of the underlying core to ambient air. A review of the Sugama reference indicates that none of the embodiments teach or suggest a core channel having a curved section that is exposed to ambient air through a patterned top cladding layer.

In formulating the rejection, the Examiner states that the waveguide system of Figures 14 through 16 includes a bottom cladding layer 21, a core channel 23 having a curved section, and a top cladding layer 27 patterned to include a curved opening 16 so the underlying curved section of core channel 23 is exposed to ambient air. A review of the Sugama reference with regard to Figures 14-16 indicates that the Examiner has completely misconstrued the actual teaching of the reference. The cores 23 of Sugama: are (i) not curved; and (ii) not covered or exposed to ambient air.

In paragraph [0173] Sugama states that a description of Figure 14 is omitted because it is the same as Figure 13. A detailed discussion of Figure 13 is therefore provided below.

With reference to Figure 13 in paragraph [0170], Sugama describes an optical wiring multi-layer substrate with input optical wires 12 formed in a ***lower*** layer and output optical wires formed in an ***upper*** layer. In Paragraph [0171], Sugama further teaches that the input wiring 12 and the output wiring 13 are "***linear***" (i.e., not curved) and are "***orthogonal to each other on different layers***". In paragraph [0174], Sugama teaches that an interlayer optical via hole 16 is provided between the input wiring 12 and the output wiring 13 to optically couple the two together.

FIG. 13

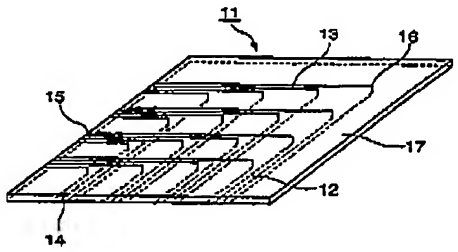
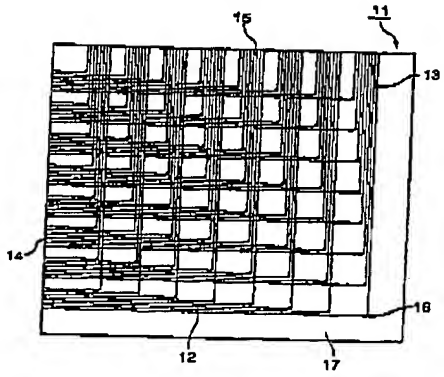


FIG. 14



Therefore, as clearly described and illustrated in Sugama, the optical wires 12 and 13 (i.e., cores) are linear and orthogonal to one another on different layers of the substrate. The optical wires 12 and 13 are **not** curved. Rather, an inter-layer optical via hole 16 is provided so the orthogonal input and output wires are in optical communication with each other.

The interlayer optical via hole 16 is illustrated in Figures 15 and 16A-16H of Sugama. Figure 15 is described by Sugama in paragraphs [0175] through [0177]. In paragraph [0175], Figure 15 is described as a cross-sectional view of an upper waveguide and a lower waveguide The two waveguides are "orthogonal" (i.e., at right angles or 90 degrees apart) from one another.

In paragraph [0176], both the upper and lower waveguides are each described as composed of three layers, including an under-cladding 22, a core 23, and an over-cladding 24, both formed an a substrate 21.

In paragraph [0177], Sugama describes the optical hole 16 as comprising the grooves 20 each covered with a reflective metal film 25.

Figure 15, provided below, clearly shows the upper and lower waveguides optically connected by the optical hole 16. The upper and lower waveguides are not curved. Rather the upper and lower waveguides are (i) on different levels with respect to one another; (ii) are linear and orthogonal with respect to one another; and (iii) communicated with one another via the optical hole 16.

FIG. 15

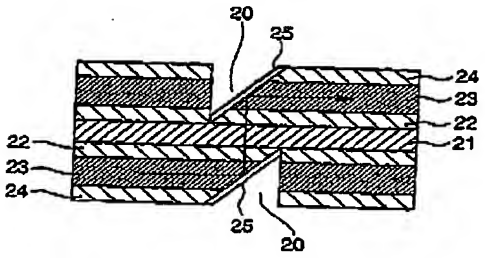


Figure 15 specifically shows the path of light through the Sugama. waveguide. The arrow (no reference number is provided) clearly shows the light path as follows:

(i) from the core 23 of the lower waveguide and reflecting upward off the mirrored surface 25 of the bottom groove 20;

(ii) through the substrate 21; and

(iii) off the upper reflective surface 25 and into the upper core 23 of the top waveguide.

The waveguide structure of Figure 15 therefore clearly teaches that the optical vias 16 are defined by the reflective surfaces 25 of the upper and lower grooves 20.

Accordingly, in no way does Sugama teach that the cores 23 are: (i) curved. On the contrary, Sugama explicitly teaches that the upper and lower cores 23 (i.e., input wires 12 and output wires 13) are ***linear***; or (ii) exposed to ambient air. Sugama specifically teaches that the optical vias 16 are in the optical path between the upper and lower waveguides and are defined by the reflective surfaces 25 of the upper and lower waveguides respectively. Sugama therefore fails to teach or suggest the present invention as claimed in the present application.

Applicant believes that all pending claims have been amended and the case is now in a condition for allowance. The applicants respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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